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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of

Francis Anthony Darmann et al.

Group Art Unit: 2827

Serial No.: 09/661,253

Examiner: I. Patel

Filed: September 13, 2000

For: SUPERCONDUCTING TAPES

AMENDMENT

Honorable Assistant Commissioner for Patents
Washington, D.C. 20231

Date: December 31, 2002

Sir:

In response to the Office Action dated July 31, 2002, the period for response having been extended two months to December 31, 2002, the following amendments and remarks are respectfully submitted in connection with the above-identified application.

In the Specification:

Replace the paragraph beginning on page 5, line 30 with the following paragraph:

The embodiment described above has used eight monofilamentary constituent tapes 12 and has a final thickness between 0.25 and 0.3 mm. However, more or fewer tapes can be used and the width, thickness and number of sub-stacks varied depending upon the application of the tape and the relevant (but conflicting) requirements for capacity and flexibility. In most cases the balance of thicknesses and

rolling reduction should be such that the filament thickness is generally in the range 10-40 μm , but preferably close to the lower end of that range.

Replace the paragraph beginning on page 6, line 6 with the following paragraph:

Twisted (or untwisted) multifilamentary tapes, if desired with different numbers of filaments, different pitches and/or different twisting sense or direction, could also be stacked and bonded together and provided with or without the outer layers of silver/silver alloy such as bridging tape 13 and 14, but the invention is not expected to show the same benefits for twisted tapes as for untwisted ones.

In the Claims:

The following replacement claims are respectfully submitted:

1. (Twice Amended) A composite superconducting tape comprising a multiplicity of constituent superconducting tapes stacked parallel to one another with major faces in contact, wherein at least some of the constituent superconducting tapes have widths not greater than half a width of the composite superconducting tape and are laid edge-to-edge with each other, the composite superconducting tape including at least one tape bridging the stacks.

2. (Amended) A composite superconducting tape as claimed in claim 1, in which all the constituent superconducting tapes have a width that is substantially a simple

fraction of the width of the composite superconducting tape so that the constituent superconducting tapes form two or more stacks with aligned zones therebetween which contain no superconducting material.

3. (Amended) A composite superconducting tape as claimed in claim 2, in which the simple fraction is a half, so that there are two stacks.

4. (Twice Amended) A composite superconducting tape as claimed in claim 1, wherein the at least one bridging tape is a full width of the composite superconducting tape and is produced from a silver or silver alloy material.

5. (Amended) A composite superconducting tape as claimed in claim 4, wherein there are at least two full-width metal bridging tapes, one bridging tape at one end of the stacks and a second bridging tape at another end of the stacks.

7. (Twice Amended) A composite superconducting tape as claimed in claim 5, wherein respective strengths of the two full-width metal tapes are unequal.

8. (Twice Amended) A composite superconducting tape as claimed in claim 1, in which the composite superconducting tape is diffusion-bonded and all elongate components extend longitudinally.

9. (Twice Amended) A composite superconducting tape as claimed in claim 1, in which the constituent superconducting tapes are all powder-in-tube superconducting tapes.

11. (Twice Amended) A composite superconducting tape constructed from a plurality of superconducting tapes each having two opposite major faces and two opposite edges extending between the major faces, the composite superconducting tape including:

a first stack having a plurality of the superconducting tapes wherein each superconducting tape in the first stack has at least one major face in contact with a major face of an adjacent superconducting tape in the first stack;

a second stack having a plurality of superconducting tapes wherein each superconducting tape in the second stack has a least one major face in contact with a major face of an adjacent superconducting tape in the second stack, wherein at least some of the superconducting tapes have widths not greater than half a width of the composite superconducting tape; and

at least one bridging tape spanning between the first and second stacks for maintaining the first and second stacks in a substantially parallel edge-to-edge configuration.

12. (Amended) A composite superconducting tape as claimed in claim 11,

wherein all the superconducting tapes have a width that is substantially a simple fraction of the width of the composite superconducting tape so that the superconducting tapes form at least the first and second stacks with aligned zones therebetween which contain no superconducting material.

13. (Amended) A composite superconducting tape as claimed in claim 12, wherein said simple fraction is a half, so that there are two stacks.

14. (Amended) A composite superconducting tape as claimed in claim 11, wherein the bridging tape is a full width of the composite superconducting tape and is produced from a silver or silver alloy material.

15. (Amended) A composite superconducting tape as claimed in claim 14, wherein there are at least two full-width metal bridging tapes, one bridging tape at one end of the stacks and a second bridging tape at another end of the stacks.

16. (Amended) A composite superconducting tape as claimed in claim 15, wherein respective strengths of the two full-width metal tapes are unequal.

17. (Amended) A composite superconducting tape as claimed in claim 11,

wherein the composite superconducting tape is diffusion-bonded and all elongate components extend longitudinally.

18. (Amended) A composite superconducting tape as claimed in claim 11, in which the superconducting tapes are all powder-in-tube superconducting tapes.

REMARKS

Claims 1-5, 7-9 and 11-18 are pending in the present application. Replacement claims 1-5, 7-9, and 11-18 have been presented herewith.

Priority Under 35 U.S.C. 119

Applicants note the Examiner's acknowledgment of the Claim for Priority under 35 U.S.C. 119, and that the certified copy of the priority document has not been received. The certified copy of the priority document will be submitted in due course.

Information Disclosure Statement

The Examiner is respectfully requested to acknowledge receipt of the Information Disclosure Statement filed on December 12, 2002, and to consider and cite the corresponding documents of record in the present application.

Drawings

The drawings have been objected to under 37 C.F.R. 1.84(h)(3), as not being properly cross-hatched. In a separate Drawing Correction Approval Request filed concurrently herewith, cross-hatching has been clarified in silver bridging tape 13 and cross-hatching has been added to cladding 7 in each of monofilamentary tapes 12 in Fig. 1. Similarly, cross-hatching has been added to the cladding in each of monofilamentary tapes 12 in Fig. 2.

Applicants note that the superconducting material in filament 5 of Fig. 1 is described on page 4, lines 20-25 as BSCCO-2223 oxide powder, or as a precursor convertible to a Bi-2223 composition. As described on page 1, lines 20-22 of the application, the Bi-2223 oxide includes bismuth, strontium, calcium and copper. However, Applicants are unable to readily identify the appropriate cross-hatching for filament 5 that would satisfy the requirements in Manual of Patent Examining Procedure 608.02. **Accordingly, the Examiner is respectfully requested to approve proposed corrected Figs. 1 and 2, or in the alternative to identify the appropriate cross-hatching for filament 5 of Figs. 1 and 2.**

Claim Rejections-35 U.S.C. 112

Claims 7 and 16 have been rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Examiner has alleged that it is not clear what is meant by the “unequal strength” of both the metal tapes. This rejection is respectfully traversed for the following reasons.

Claim 7 features that “respective strengths of the two full-width metal tapes are unequal”. Applicants respectfully submit that one of ordinary skill would readily understand the meaning of claim 7, in that the tapes have unequal strength. This should be readily understood as described beginning on page 2, line 29 through to page 3, line 3 of the present application. When full-width metal tapes are provided one at each end of the stack, the stronger tape respectively is used on the convex side of

any curve. Applicants respectfully submit that claims 7 and 16 are in compliance with 35 U.S.C. 112, second paragraph, and thus respectfully urge the Examiner to withdraw this rejection for at least the above reasons.

Claim Rejections-35 U.S.C. 102

Claims 1, 4, 5, 7, 8 and 14-17 have been rejected under 35 U.S.C. 102(e) as being anticipated by the Kaneko reference (U.S. Patent No. 6,381,832). This rejection is respectfully traversed for the following reasons.

Section 6 of Office Action

In response to the Examiner's statements in Section 6, the Applicant would like to assert the following with respect to each of the five paragraphs in Section 6.

In Paragraph 1, the Examiner stated:

"Regarding claims 1 and 11 Kaneko discloses a composite superconducting tape comprising a multiplicity of constituent superconducting tape stacked parallel to one another with major faces in contact, wherein at least some of the constituent tapes have widths greater than half the width of the composite tape including at least one tape bridging the stacks (tape like shaped superconducting wire with conductive plate 2 and 3, see figure 3D, column 10, line 45 to column 11, line 40)."

The Applicant strongly asserts that the Kaneko reference is not relevant to the above-captioned Application. The Applicant respectfully submits that the Examiner's conclusions are incorrect in that Kaneko merely discloses **a single superconducting tape which does not comprise of a "multiplicity of constituent superconducting tapes."** It appears, perhaps, that the Examiner may be confusing the layers of the single Kaneko tape in Figure 3D – i.e., one or more of layers 1, 2 and 3 – with the multiple tapes of the present Application – i.e., each of the tapes 12. This significant difference is explained in detail below.

As even Kaneko's title indicates, the Kaneko patent concerns a "Process for the Production of A[n Individual] Superconducting Wire Having a Stacked Structure." The Applicant contends, without being limiting in any way, that Kaneko's single "wire" is, at least, roughly analogous to the individual "tapes" disclosed in the present Application. In fact, in lines 45 to 47 of column 10, for example, Kaneko refers to the individual "wire" as a **"tape-like shaped superconducting wire"**. Accordingly, since Kaneko involves the formation of a single tape/wire, and the Application involves a composite tape which is composed of a **multiplicity** of tapes and a bridging layer, the Applicant respectfully contends Kaneko has **no relevance to any of the Application's claims**.

Moreover, in complete contrast to the present Application, the "stacking" in Kaneko merely concerns the stacking of the **"layers" that comprise the single wire**. Conversely, the Application concerns the stacking of **multiple tapes**. For example, Kaneko states that the single tape/wire has "a stacked structure comprising (a) an electrically conductive

substrate, (b) a layer composed of an oxide superconductor having a high critical temperature, and (c) a layer composed of an electrically conductive material which is substantially of an electrically conductive material which is substantially not reactive with the oxide superconductor of said layer b.” (Column 3, lines 30 to 35.)

Accordingly, the single Kaneko “wire” is, at least, somewhat analogous to the individual tapes of the Application in that both have a sheath (i.e., layers 2 and 3 in Kaneko are at least loosely comparable to the Application’s cladding 7) that surrounds an oxide layer (1 in Kaneko and 5 in the Application). The fact that Kaneko’s tape/wire is similar to the individual tapes of the Application logically implies that Kaneko has no relevance to the patentability of this Application – that is, since again, this Application concerns multiple tapes within a composite tape.

While the difference between Kaneko’s single superconducting tape and the Application’s composite superconducting tape composed of multiple tapes represents a large and crucial difference between Kaneko and the present Application, other significant differences also emanate from this one. For example:

- (a) Since Kaneko merely involves a superconducting tape/wire, Kaneko therefore cannot disclose the “parallel stacking” of multiple tapes, with the major faces of such **tapes** in contact.
- (b) Further, it would likewise be impossible for Kaneko to disclose “some” constituent tapes to having widths not greater than half of the width of the

composite superconducting tape since – again – Kaneko only involves a single tape/wire.

- (c) Finally, it would also be impossible for Kaneko to disclose a bridging tape that bridges a “multiplicity” of tapes – again, since Kaneko merely involves a single tape.

In paragraph 2, the Examiner stated:

“Regarding claim 4 and 14, Kaneko further discloses at least one full width bridging tape produced from silver (Ag film 3’ or 3, see figure 3C and 3D, column 10, line 45 to column 11, line 40).”

The Applicant respectfully submits that **Kaneko does not disclose a bridging tape of any sort**. The “bridging” tape in the Application is a layer that bridges **stacks of tapes** (e.g., as stated in claim 1) and spans between **stacks of tapes** for maintaining such stacks in a substantially parallel edge-to-edge configuration (e.g., as stated in claim 11). For example, please see the bridging tape 13 in Figure 1 of the Application.

In stark contrast to the Application, it would appear that the silver tape referred to in Kaneko (column 10, line 45 to column 11, line 40) is **simply a layer of the single tape/wire** disclosed by Kaneko. That is, the Ag film 3 to which the Examiner refers appears to merely represent one layer of the sheath in which the oxide superconductor layer 1 resides. (The other side of the sheath appears to be represented by layer 2 in Figures 3C and 3D.)

Unlike Kaneko, the present Application discloses a “silver bridging tape 13” (page 4, line 16) that does **not serve as a sheath of an individual tape** – i.e., it does not serve as an outer layer that surrounds the oxide layer. Rather, the Ag layer in the present Application “**bridges**” a **multiplicity of individual tapes** – each of these tapes having its own sheath.

In paragraph 3, the Examiner stated:

“Regarding claim 5 and 15, Kaneko further discloses two full-width metal tape, metal plate 2 and 3, see figure 3C and 3D, column 10, line 45 to column 11, line 40.”

Metal plates 2 and 3 in Kaneko are not “bridging” tapes. Rather, as argued above, plates 2 and 3 merely represent **layers** of the outside shell (or sheath) of an **individual tape**. In fact, the portion of Kaneko to which the Examiner refers (column 10, line 45 to column 11, line 40) specifically refers to the preparation of a “tape-like shaped superconducting wire” (column 10, lines 45 to 47). Such an **individual tape/wire** is said to be formed by three **layers**; namely, an outer **layer** of silver alloy (line 51, column 10) a middle oxide superconductor **layer** (column 10, line 57), and **another outer layer** – this one comprised of an Ag film (column 11, line 4).

In paragraph 4, the Examiner stated:

“Regarding claim 7 and 16, as understood by the examiner, Kaneko further discloses the tapes with different melting temperatures.”

Since, as argued in the sections immediately above, Kaneko does not disclose a “bridging” tape, it is impossible for Kaneko to disclose bridging tapes with different melting temperatures. Once again, it appears that the Examiner may be confusing the “bridging tape” of the Application with the sheath “layers”, 2 and 3, of the **individual tape** disclosed in Kaneko.

In paragraph 5, the Examiner stated:

“Regarding claim 8 and 17, Kaneko further discloses the tape is diffusion bonded and all elongate components extends longitudinally (column 8, line 25-35).”

Since Kaneko merely discloses the formation of an individual tape, it is **impossible** for Kaneko to teach the diffusion bonding of multiple tapes.

Claim Rejections-35 U.S.C. 103

Claims 2, 3, 12 and 13 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Kaneko reference. Also, claims 9 and 18 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Kaneko reference in further view of the Sato et al. reference (U.S. Patent No. 5,288,699).

Section 8 of Office Action

Kaneko does not disclose substacks of “**tapes**”. Rather, in sharp contrast to the present Application, Kaneko merely discloses the formation of **a single tape**.

Further, it would appear that the Examiner's use of the phrase "substacks without superseding material between the zones" may be merely referring to the subdivisions within Kaneko's oxide layer. More specifically, these remarks seem to refer to subdivisions within layer 1 (e.g., in Figure 3D) that do not have any of layer 3's material superseding the oxide subdivisions. In very sharp contrast, the Applicant would like to respectfully emphasise that the Application refers to **substacks of "tapes"**; not, subdivisions within an oxide layer of an individual tape.

Section 9 of Office Action

Once again, the Applicant strongly contends that **Kaneko does not disclose a multiplicity of tapes**. Since Kaneko only discloses the formation of a single tape, the Applicant respectfully submits that the combination of the Kaneko and Sato references do not make Claims 9 and 18 unpatentable. Accordingly, the applicant contends that the 35 USC 103(a) rejections of claims 9 and 18 are overcome.

Conclusion

Applicants respectfully submit that the claims distinguish over and would not have been obvious in view of the prior art as relied upon by the Examiner for at least the above reasons. The corresponding amendments have thus been made merely to improve antecedent, rather than to further distinguish over the relied upon prior art.

Accordingly, these amendments to the claims should not be construed as limiting scope within the meaning of *Festo*.

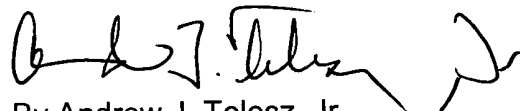
The Examiner is respectfully requested to reconsider and withdraw the corresponding rejections, and to pass the claims of the present application to issue, for at least the above reasons.

Pursuant to the provisions of 37 C.F.R. 1.17 and 1.136(a), the Applicants hereby petition for an extension of two (2) months to December 31, 2002, for the period in which to file a response to the outstanding Office Action. The required fee of \$400.00 is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 50-0238 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Enclosures: Version with Marked-Up Changes